

**SELF-STUDY
Course 3030-G**

Principles of EPIDEMIOLOGY

Second Edition

An Introduction to
Applied Epidemiology and Biostatistics

12/92

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES

**Public Health Service
Centers for Disease Control
and Prevention (CDC)**
Epidemiology Program Office
Public Health Practice Program Office
Atlanta, Georgia 30333

Acknowledgements

Developed by

U.S. Department of Health and Human Services Public Health Service

Centers for Disease Control and Prevention (CDC)
Epidemiology Program Office (EPO)
Public Health Practice Program Office (PHPPO)

Project Lead, Technical Content

Richard Dicker, M.D., M.Sc., Division of Training, EPO, CDC

Project Lead, Instructional Design

Nancy C. Gathany, M.Ed., Division of Media and Training Services
(DMTS), PHPPO, CDC

Design and Development Team

Pat Anderson, Training Assistant, DMTS, PHPPO, CDC
Betty S. Segal, Instructional Editor, DMTS, PHPPO, CDC
Stephen R. Smith, M.S., Training Development Specialist, DMTS,
PHPPO, CDC
Philip Thompson, M.S., Editor, PHPPO, CDC

Graphics/Illustrations

Travis Benton, DMTS, PHPPO, CDC
Mindy Cooper, DMTS, PHPPO, CDC
Lee Oakley, DMTS, PHPPO, CDC

General Directions and Course Information

Self-Study Course 3030-G

This course was developed by the Centers for Disease Control and Prevention (CDC) as a self-study course. In order to receive CME/CEU credit or a certificate, you must be formally enrolled with the CDC and successfully complete the course within six months. If you intend to complete the course, including taking the final examination, please contact the CDC at 1-800-41 TRAIN to request the application/enrollment package.

Study Materials

The course materials consist of six lessons with Self-assessment Quizzes.

A copy of Benenson's *Control of Communicable Diseases in Man*, 15 ed., will be very useful as a reference, since it clearly describes many diseases as to clinical nature, laboratory diagnosis, occurrence, agent, reservoir, mode of transmission, incubation period, period of communicability, susceptibility and resistance, as well as methods of prevention and control. This text can be obtained from the following:

American Public Health Association
1015 Fifteenth Street NW
Washington, DC 20005
(202) 789-5600

(NOTE: Current price information available from publisher.)

A calculator with square root and logarithmic functions will be useful with some of the exercises. Cost for supplementary materials will be the enrollee's responsibility.

Course Design

This course covers basic epidemiology principles, concepts, and procedures. This course is designed for federal, state, and local government health professionals and private sector health professionals who are responsible for disease surveillance or investigation. The course consists of study of the concepts, principles, and methods generally useful in the surveillance and investigation of health-related states or events. A basic understanding of the practices of public health and biostatistics is recommended.

Objectives

The following objectives are presented as a guide for the student as to the specific skills and/or knowledge which should be acquired from careful reading and study of the assignments. The objectives serve two purposes. They constitute an outline which initially conveys the major points or target areas of the material to be studied. Then, after the lesson is completed, the objectives serve as a review and check for the student, who can use them to determine if sufficient gains have been made in skills and/or understanding.

It is important to note that the lesson itself should serve as an indication only of how well concepts and terms have been grasped. It is incumbent upon the student to master as much of the material as possible. While it is felt that the questions and objectives are comprehensive, they cannot, because of obvious constraints, comprise an exhaustive treatment of the subjects assigned.

Students who successfully complete this course should be able to correctly:

- Describe key features and applications of descriptive and analytic epidemiology.
- Calculate and interpret ratios, proportions, incidence rates, mortality rates, prevalence, and years of potential life lost.
- Calculate and interpret mean, median, mode, ranges, variance, standard deviation, and confidence interval.
- Prepare and apply tables, graphs, and charts such as arithmetic-scale line, scatter diagram, pie chart, and box plot.
- Describe the processes, uses, and evaluation of public health surveillance.
- Describe the steps of an outbreak investigation.

General Directions to the Student

Self-study courses are “self-paced.” However, we recommend that a lesson be completed within two weeks to insure continuity of thought, retention of knowledge, and maintenance of interest.

To get the most out of this course, establish a regular time and method of study. Research has shown that these factors greatly influence learning ability.

Each lesson in the course consists of reading, exercises, and an examination. The examination that accompanies each lesson is open-book and does not have to be completed at one sitting.

Reading Assignments

Complete the assigned reading before attempting to answer any questions. Reading assignments by reference and inclusive pages are found in each lesson. Some answers to questions cannot be pinpointed in the reference, and questions can only be answered by integrating information from an entire lesson and/or previous lessons.

A casual reading of the reference can result in missing useful information which supports main themes. Read thoroughly and reread for understanding as necessary.

Assignments are designed to cover one or two major subject areas. However, as you progress, it is often necessary to combine previous learning to accomplish new skills. Review previous assignments if you find continuity of ideas or procedures is lacking.

Lessons

After completing the reading assignment, answer the questions which you are certain that you know. **DO NOT GUESS.** Remember, all lessons are **OPEN-BOOK**, so refer to the references when you are unsure of the answer. When you consult the references, it is important that you find not only an answer to a question, but also an understanding of the point being taught. To pass each quiz you must answer at least 20 of the questions correctly; this indicates that you have a sufficient level of comprehension to go to the next lesson. To correctly answer a question, you must circle **ALL** of the correct choices for that question. The correct answers are provided in Appendix J with explanations and reference page numbers. If you miss more than five questions, you are probably not ready to continue with the next lesson. After passing all six lesson quizzes, you should be prepared for the final examination. The completed lesson quizzes and exercises are good study references for the final exam.

Exercises

Practice exercises and review exercises are included within each lesson to help you apply the lesson content. Some exercises may be more applicable to your workplace and background than others. You should review the answers to all exercises since the answers are very detailed. Answers to the exercises can be found at the end of each lesson. Your answers to these exercises are valuable study guides for the final examination.

Questions

Self-study lesson questions are objective and emphasize the main points taught. The key to completing multiple-choice questions is careful reading of the questions. They are designed to instruct, not to deceive. It is, however, incumbent upon the student to follow the instructions as stated. Answers should be reviewed.

- Read the stem carefully. Note that the question may ask, “Which is CORRECT?” as well as “Which is NOT CORRECT?” or “Which is the EXCEPTION?”
- Read all of the choices given. One choice may be a correct statement, but another choice may be more nearly correct or complete for the question that is asked. Unless otherwise noted, there is only ONE CORRECT answer.
- To answer multiple-choice questions, circle letter representing the answer which you think is most correct.

You may keep the course materials and quiz sheets. They will be valuable study guides for the final examination.

The questions are designed so that upon successful completion of each lesson, the student will meet the criteria for the lessons. These criteria are delineated in the performance objectives given at the beginning of each lesson. Use these objectives as a guide to the competencies which you should achieve.

Students should score 80 percent or higher on all lessons. It is felt that this will demonstrate comprehension and will facilitate success on future lessons and on the final examination.

We ask that the course materials and corrected answer sheets NOT BE REPRODUCED. We ask, also, that the course materials and corrected answer sheets NOT BE DISTRIBUTED TO OTHER PROSPECTIVE STUDENTS.

There are practical as well as ethical reasons for the above requests. Prior knowledge of answers or lesson questions does not benefit a person taking the final examination, where knowledge and skills must be demonstrated. Also, the lessons are revised periodically. Questions are revised, question order is altered, and other changes are made which would make the out-of-date materials useless or even harmful to another's progress.

Final Examination and Course Evaluation

The final examination, evaluation, and answer sheets will be sent to you after the CDC Distance Learning Program (DLP) receives the Request For Final Exam (RFE) Form. **Students have 30 days to complete the final examination.**

The final requirement for the course is an open-book examination. We recommend that you thoroughly review the questions included with each lesson before completing the exam.

Lessons 2 and 3 in the workbook discuss applied biostatistics used in epidemiology. Some students may not apply biostatistics in their work, and may feel that they do not need to learn all the material on analytic statistics presented in the workbook. To accommodate these participants, there is a new abbreviated option which reflects their need for less-intensive statistical study:

- | | |
|------------------|---|
| Lesson 2: | Pages 73-91; 100-102; 116-117
Self-Assessment Quiz Questions 1-12 (Pages 136-138) |
| Lesson 3: | Pages 145-163; 167-168; 173-179; 186-189
Self-Assessment Quiz Questions 1-8, 10, 12, 18-21, 23 (Pages 197-202) |

The final exam will be structured so that students will select test questions relevant to the option they selected.

For those officially enrolled in the CDC Distance Learning Program, a certificate of satisfactory completion is awarded to each student who makes a score of at least 70% on the final examination.

If you are taking this course under a CDC-approved Group Leader, other quiz or final examination arrangements may be followed.

It is our sincere hope that you will find this undertaking to be a profitable and satisfying one. We solicit your constructive criticism at all times and ask that you let us know whenever you have problems or need assistance. We congratulate you on this endeavor, and we shall follow your progress with keen interest.

Education Units

This course is designed in accordance with the criteria and guidelines of the International Association for Continuing Education and Training (IACET). CDC is accredited by IACET to award Continuing Education Units (CEU) to non-academic students who successfully complete the course as follows:

Option 1: For those who complete Lessons 2 and 3 in their entirety = 4.2

Option 2: For those who complete the designated portions of Lessons 2 and 3 = 3.5

The credits provide a nationally recognized record of an individual's continuing education accomplishments. All students who score 70% or higher on the final examination are awarded CDC's certificate of successful completion; non-academic students also receive continuing education credits.

The Centers for Disease Control and Prevention (CDC) is accredited by the Accreditation Council for Continuing Medical Education to sponsor continuing medical education for physicians. CDC designates this continuing medical education activity for the following credit hours in Category 1 of the Physician's Recognition Award of the American Medical Association:

Option 1: For those who complete Lessons 2 and 3 in their entirety = 4.2

Option 2: For those who complete the designated portions of Lessons 2 and 3 = 3.5

Links to Lessons

<u>Lesson One: Introduction to Epidemiology</u>	1
<i>Key features and applications of descriptive and analytic epidemiology</i>	
<u>Lesson Two: Frequency Measures Used in Epidemiology</u>	73
<i>Calculation and interpretation of ratios, proportions, incidence rates, mortality rates, prevalence, and years of potential life lost</i>	
<u>Lesson Three: Measures of Central Location and Dispersion</u>	145
<i>Calculation and interpretation of mean, median, mode, ranges, variance, standard deviation, and confidence interval</i>	
<u>Lesson Four: Organizing Epidemiologic Data</u>	205
<i>Preparation and application of tables, graphs, and charts such as arithmetic-scale line, scatter diagram, pie chart, and box plot</i>	
<u>Lesson Five: Public Health Surveillance</u>	289
<i>Process, uses, and evaluation of public health surveillance in the United States</i>	
<u>Lesson Six: Investigating an Outbreak</u>	347
<i>Steps of an outbreak investigation</i>	
<u>Appendices</u>	426